CLAIMS

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

1. An apparatus for designing or deploying a communications network, comprising:

a means for providing

(I) a computerized model which represents a physical environment in which a communications network is or will be installed, said computerized model providing a display of at least a portion of said physical environment, and

(II) performance attributes for a plurality of system components which may be used in said physical environment, a number of said system components having associated with them frequency dependent characteristics wherein said frequency dependent characteristics define electrical properties of said system components at at least two different frequencies;

a means for selecting specific components from said plurality of system components for use in a communications network;

a means for representing said selected specific components in said display; and

a means for running prediction models using the computerized model and said performance attributes to predict performance characteristics of said communications network comprised of said selected specific components, said prediction models utilizing said frequency dependent characteristics in calculations which predict said performance characteristics of said communications network.

2. An apparatus for designing or deploying a communications network, comprising:

a means for providing

(I) a computerized model which represents a physical environment in which a communications network is or will be installed, said computerized model providing a display of at least a portion of said physical environment, and

(II) performance attributes for a plurality of system components which may be used in said physical environment, a number of said system components having associated with them frequency dependent characteristics, and wherein said system components allow one or more of the following: (a) converting between radio frequency and optical frequency, (b) converting between optical frequency and baseband frequency, and (c) converting between radio frequency and baseband frequency;

a means for selecting specific components from said plurality of system components for use in a communications network;

a means for representing said selected specific components in said display; and

a means for running prediction models using the computerized model and said performance attributes to predict performance characteristics of said communications network comprised of said selected specific components, said prediction models utilizing said frequency dependent characteristics in calculations which predict said performance characteristics of said communications network.

3. The apparatus of claim 2 wherein said performance attributes provided by said means for providing include those of system components that allow for (a) converting between radio frequency and optical frequency.

4. The apparatus of claim 2 wherein said performance attributes provided by said means for providing include those of system components that allow for (b) converting between optical frequency and baseband frequency.

5. The apparatus of claim 1 wherein said performance attributes provided by said means for providing include those of system components that allow for (c) converting between radio frequency and baseband frequency.

6. A method for designing or deploying a communications network, comprising the steps of:

providing a computerized model which represents a physical environment in which a communications network is or will be installed, said computerized model providing a display of at least a portion of said physical environment;

providing performance attributes for a plurality of system components which may be used in said physical environment, a number of said system components having associated with them frequency dependent characteristics, and wherein said system components operate at at least one of optical frequencies, radio frequencies, and baseband frequencies;

selecting specific components from said plurality of system components for use in a communications network;

representing said selected specific components in said display;

running prediction models using the computerized model and said performance attributes to predict performance characteristics of said communications network comprised of said selected specific components, said prediction models utilizing said frequency dependent characteristics in calculations which predict said performance characteristics of said communications network.

7. The method of claim 6 wherein said representing step includes representing interconnections of specific components in said display.

8. The method of claim 7 further comprising the step of providing an indication that two or more specific components should not be interconnected.

9. The method of claim 6 further comprising the step of providing an indication that said selected specific components do or do not meet a design criteria for said communications network.

10. The method of claim 9 wherein said design criteria is a performance parameter.

11. The method of claim 9 wherein said design criteria is a cost parameter.

12. The method of claim 9 wherein said design criteria is a component brand criteria.

13. The method of claim 6 wherein said frequency dependent characteristics define electrical properties of said system components at at least two different frequencies.

14. The method of claim 6 further comprising the step of generating a bill of materials containing cost information for said selected specific components utilized in said communications network.

15. The method of claim 14 wherein said cost information comprises a maintenance schedule for selected specific components.

16. The method of claim 14 wherein said cost information comprises an installation cost for selected specific components.

17. The method of claim 14 wherein said cost information comprises a purchase price for selected specific components.

18. The method of claim 6 wherein said display is three dimensional.

19. The method of claim 6 wherein said system components allow converting between radio frequency and optical frequency.

20. The method of claim 6 wherein said system components allow converting between optical frequency and baseband frequency.

21. The method of claim 6 wherein said system components allow converting between radio frequency and baseband frequency.

22. The method of claim 6 further comprising the step of identifying errors in physical media connections for two or more specific components selected in said selecting step.

23. An apparatus for designing or deploying a communications network, comprising:

a means for providing

(I) a computerized model which represents a physical environment in which a communications network is or will be installed, said computerized model providing a display of at least a portion of said physical environment, and

(II) performance attributes for a plurality of system components which may be used in said physical environment, a number of said system

components having associated with them frequency dependent characteristic, and wherein said system components operate at at least one of optical frequencies, radio frequencies, and baseband frequencies;

a means for selecting specific components from said plurality of system components for use in a communications network;

a means for representing said selected specific components in said display; and

a means for running prediction models using the computerized model and said performance attributes to predict performance characteristics of said communications network comprised of said selected specific components, said prediction models utilizing said frequency dependent characteristics in calculations which predict said performance characteristics of said communications network.

24. The apparatus of claim 23 wherein said means for representing represents interconnections of specific components in said display.

25. The apparatus of claim 24 further comprising a means for providing an indication that two or more specific components should not be interconnected.

26. The apparatus of claim 24 further comprising a means for providing an indication that said selected specific components do or do not meet a design criteria for said communications network.

27. The apparatus of claim 26 wherein said design criteria is a performance parameter.

28. The apparatus of claim 26 wherein said design criteria is a cost parameter.

29. The apparatus of claim 26 wherein said design criteria is a component brand criteria.

30. The apparatus of claim 23 further comprising a means for generating a bill of materials containing cost information for said selected specific components utilized in said communications network.

31. The apparatus of claim 30 wherein said cost information comprises a maintenance schedule for selected specific components.

32. The apparatus of claim 30 wherein said cost information comprises an installation cost for selected specific components.

33. The apparatus of claim 30 wherein said cost information comprises a purchase price for selected specific components.

34. The apparatus of claim 23 wherein said display is three dimensional.

35. The apparatus of claim 23 further comprising a means for identifying errors in physical media connections for two or more selected specific components.

36. The apparatus of claim 23 wherein said frequency dependent characteristics provided by said means for providing define electrical properties of said system components at at least two different frequencies.

37. The apparatus of claim 23 wherein said system components provided by said means for providing allow one or more of the following: (a) converting between radio frequency and optical frequency, (b) converting

between optical frequency and baseband frequency, and (c) converting between radio frequency and baseband frequency.

38. The apparatus of claim 37 wherein said performance attributes provided by said means for providing include those of system components that allow for (a) converting between radio frequency and optical frequency.

39. The apparatus of claim 37 wherein said performance attributes provided by said means for providing include those of system components that allow for (b) converting between optical frequency and baseband frequency.

40. The apparatus of claim 37 wherein said performance attributes provided by said means for providing include those of system components that allow for (c) converting between radio frequency and baseband frequency.

41. An interactive method of designing a communication system comprising the steps of:

identifying by a designer locations, termed "watch points", in a displayed environment where certain levels of system performance are desirable or critical;

modeling by the designer a communication system using a graphical user interface (GUI) for an environmental database, wherein at least a portion of said communication system may be displayed as being interconnected in the displayed environment;

performing a performance prediction on the modeled communication system; and

providing feedback on a display to the designer regarding a predicted performance metric at the watch points throughout an environment of the modeled communication system.

42. The interactive method of designing a communication system recited in claim 41, wherein the watch points are points which the designer identifies by visually pointing and/or clicking with a mouse or other input device at the desired location in the displayed environment.

43. The interactive method of designing a communication system recited in claim 41, wherein the feedback provided to the designer at each watch point is a computed number displayed as text that represents one or more performance metrics.

44. The interactive method of designing a communication system recited in claim 43, wherein the performance metric is one or more of received signal strength (RSSI), signal-to-interference ratio (SIR), signal-to-noise ratio (SNR), frame error rate (FER), bit error rate (BER), packet error rate (PER), throughput, E_c/I_o, delay, noise figure, noise, gain, attenuation, and SINR.

45. The interactive method of designing a communication system recited in claim 41, wherein the feedback provided to the designer at each watch point is a small region of solid color whose shade and/or tint varies relative to one or more performance metrics.

46. The interactive method of designing a communication system recited in claim 45, wherein the performance metric is one or more of received signal strength (RSSI), signal-to-interference ratio (SIR), signal-to-noise ratio (SNR), frame error rate (FER), bit error rate (BER), packet error rate

(PER), throughput, E_c/I_o, delay, noise figure, noise, gain, attenuation, SINR.

47. The interactive method of designing a communication system recited in claim 41, wherein the feedback provided to the designer at each watch point is in the form of colored lines linking the watch point location with the location of one or more antennas in the communication system, where the color, thickness, and/or other displayed aspect of the connecting line varies relative to one or more performance metrics, or is dependent upon whether a forward or reverse link is being analyzed.

48. The interactive method of designing a communication system recited in claim 41, further comprising the steps of:

modifying by the designer the modeled communication system; and

simultaneously performing a performance prediction on the modified modeled communication system and providing feedback on the display to the designer regarding the predicted performance at the watch points.

49. The interactive method of designing a communication system recited in claim 41, further comprising the steps of:

moving by the designer the position of one or more watch points in the displayed environment; and

simultaneously performing a performance prediction on the communication system and providing feedback on the display to the designer regarding the predicted performance at the watch points.

50. The interactive method of designing a communication system recited in claim 49, wherein the movement of a watch point represents a mobile user of the communication system.

51. The interactive method of claim 41 wherein said environmental database is three dimensional.

52. The interactive method of claim 41 wherein said communication system modeled in said modeling step includes one or more wireless communication components.

53. A system for interactive design of a communication system comprising:

means for identifying by a designer locations, termed "watch points", in a displayed environment where certain levels of system performance are desirable or critical;

means for modeling by the designer a communication system using a graphical user interface (GUI) for an environmental database, wherein at least a portion of said communication system may be displayed as being interconnected in the displayed environment;

means for performing a performance prediction on the modeled communication system; and

means for providing feedback on a display to the designer regarding a predicted performance metric at the watch points throughout an environment of the modeled communication system.

54. The system of claim 53, wherein the watch points are points which the designer identifies by visually pointing and/or clicking with a mouse or other input device at the desired location in the displayed environment.

55. The system of claim 53, wherein the feedback provided to the designer at each watch point is a computed number displayed as text that represents one or more performance metrics.

56. The system of claim 55, wherein the performance metric is one or more of received signal strength (RSSI), signal-to-interference ratio (SIR), signal-to-noise ratio (SNR), frame error rate (FER), bit error rate (BER), packet error rate (PER), throughput, E_c/I_o, delay, noise figure, noise, gain, attenuation, and SINR.

57. The system of claim 53, wherein the feedback provided to the designer at each watch point is a small region of solid color whose shade and/or tint varies relative to one or more performance metrics.

58. The system of claim 57, wherein the performance metric is one or more of received signal strength (RSSI), signal-to-interference ratio (SIR), signal-to-noise ratio (SNR), frame error rate (FER), bit error rate (BER). packet error rate (PER), throughput, E_c/I_o, delay, noise figure, noise, gain, attenuation, and SINR.

59. The system of claim 53, wherein the feedback provided to the designer at each watch point is in the form of colored lines linking the watch point location with the location of one or more antennas in the communication system, where the color, thickness, and/or other physical aspect of the connecting line varies relative to one or more performance metrics, or is dependent upon whether a forward or reverse wireless system channel is being analyzed.

60. The system of claim 53, further comprising:

means for modifying by the designer the modeled communication system; and

means for simultaneously performing a performance prediction on the modified modeled communication system and providing feedback on

the display to the designer regarding the predicted performance at the watch points.

61. The system of claim 53, further comprising:

means for moving by the designer the position of one or more watch points in the displayed environment; and

means for simultaneously performing a performance prediction on the communication system and providing feedback on the display to the designer regarding the predicted performance at the watch points.

63. The system of claim 62, wherein the movement of a watch point represents a mobile user of the communication system.

64. The system of claim 53 wherein said environmental database is three dimensional.

65. The system of claim 53 wherein said communication system modeled in said modeling step includes one or more wireless communication components.

66. A method for designing or deploying a communications network, comprising the steps of:

providing a computerized model which represents a physical environment in which a communications network is or will be installed, said computerized model providing a display of at least a portion of said physical environment;

providing performance attributes for a plurality of system components which may be used in said physical environment, a number of said system components having associated with them frequency dependent characteristics;

selecting specific components from said plurality of system components for use in a communications network;

representing said selected specific components in said display;

incorporating measured performance attributes in said physical environment into said computerized model; and

running prediction models using the computerized model and one or more of said performance attributes provided in said providing step and said measured performance attributes incorporated in said incorporating step to predict performance characteristics of said communications network comprised of said selected specific components.

67. The method of claim 66 wherein said representing step includes representing interconnections of specific components in said display.

68. The method of claim 67 further comprising the step of providing an indication that two or more specific components should not be interconnected.

69. The method of claim 66 further comprising the step of providing an indication that said selected specific components do or do not meet a design criteria for said communications network.

70. The method of claim 69 wherein said design criteria is a performance parameter.

71. The method of claim 69 wherein said design criteria is a cost parameter.

72. The method of claim 69 wherein said design criteria is a component brand criteria.

73. The method of claim 66 wherein said frequency dependent characteristics define electrical properties of said system components at at least two different frequencies.

74. The method of claim 66 further comprising the step of generating a bill of materials containing cost information for said selected specific components utilized in said communications network.

75. The method of claim 74 wherein said cost information comprises a maintenance schedule for selected specific components.

76. The method of claim 74 wherein said cost information comprises an installation cost for selected specific components.

77. The method of claim 74 wherein said cost information comprises a purchase price for selected specific components.

78. The method of claim 66 wherein said display is three dimensional.

79. The method of claim 66 wherein said system components allow converting between radio frequency and optical frequency.

80. The method of claim 66 wherein said system components allow converting between optical frequency and baseband frequency.

81. The method of claim 66 wherein said system components allow converting between radio frequency and baseband frequency.

82. The method of claim 66 further comprising the step of identifying errors in physical media connections for two or more specific components selected in said selecting step.

83. An apparatus for designing or deploying a communications network, comprising:

a means for providing

(I) a computerized model which represents a physical environment in which a communications network is or will be installed, said computerized model providing a display of at least a portion of said physical environment,

(II) performance attributes for a plurality of system components which may be used in said physical environment, a number of said system components having associated with them frequency dependent characteristics, and

(III) measured performance attributes for said physical environment;

a means for selecting specific components from said plurality of system components for use in a communications network;

a means for representing said selected specific components in said display; and

a means for running prediction models using the computerized model and one or more of said performance attributes for said system components or said measured performance attributes for said environment to predict performance characteristics of said communications network comprised of said selected specific components.

84. The apparatus of claim 83 wherein said means for representing represents interconnections of specific components in said display.

85. The apparatus of claim 84 further comprising a means for providing an indication that two or more specific components should not be interconnected.

86. The apparatus of claim 84 further comprising a means for providing an indication that said selected specific components do or do not meet a design criteria for said communications network.

87. The apparatus of claim 86 wherein said design criteria is a performance parameter.

88. The apparatus of claim 86 wherein said design criteria is a cost parameter.

89. The apparatus of claim 86 wherein said design criteria is a component brand criteria.

90. The apparatus of claim 83 further comprising a means for generating a bill of materials containing cost information for said selected specific components utilized in said communications network.

91. The apparatus of claim 80 wherein said cost information comprises a maintenance schedule for selected specific components.

92. The apparatus of claim 80 wherein said cost information comprises an installation cost for selected specific components.

93. The apparatus of claim 80 wherein said cost information comprises a purchase price for selected specific components.

94. The apparatus of claim 83 wherein said display is three dimensional.

95. The apparatus of claim 83 further comprising a means for identifying errors in physical media connections for two or more selected specific components.

96. The apparatus of claim 83 wherein said frequency dependent characteristics provided by said means for providing define electrical properties of said system components at at least two different frequencies.

97. The apparatus of claim 83 wherein said system components provided by said means for providing allow one or more of the following: (a) converting between radio frequency and optical frequency, (b) converting between optical frequency and baseband frequency, and (c) converting between radio frequency and baseband frequency.

98. The apparatus of claim 97 wherein said performance attributes provided by said means for providing include those of system components that allow for (a) converting between radio frequency and optical frequency.

99. The apparatus of claim 97 wherein said performance attributes provided by said means for providing include those of system components that allow for (b) converting between optical frequency and baseband frequency.

100. The apparatus of claim 97 wherein said performance attributes provided by said means for providing include those of system components

that allow for (c) converting between radio frequency and baseband frequency.

101. A method for designing or deploying a communications network, comprising the steps of:

providing a computerized model which represents a physical environment in which a communications network is or will be installed, said computerized model providing a display of at least a portion of said physical environment;

providing performance attributes for a plurality of system components which may be used in said physical environment, a number of said system components having associated with them frequency dependent characteristics;

selecting specific components from said plurality of system components for use in a communications network;

representing said selected specific components in said display;

running prediction models using the computerized model and said performance attributes to predict performance characteristics of said communications network comprised of said selected specific components, said prediction models utilizing said frequency dependent characteristics in calculations which predict said performance characteristics of said communications network; and

evaluating tradeoffs for one or more of cost, performance, and a combination of cost and performance.

102. The method of claim 101 wherein said representing step includes representing interconnections of specific components in said display.

103. The method of claim 102 further comprising the step of providing an indication that two or more specific components should not be interconnected.

104. The method of claim 101 further comprising the step of providing an indication that said selected specific components do or do not meet a design criteria for said communications network.

105. The method of claim 104 wherein said design criteria is a performance parameter.

106. The method of claim 104 wherein said design criteria is a cost parameter.

107. The method of claim 104 wherein said design criteria is a component brand criteria.

108. The method of claim 101 wherein said frequency dependent characteristics define electrical properties of said system components at at least two different frequencies.

109. The method of claim 101 further comprising the step of generating a bill of materials containing cost information for said selected specific components utilized in said communications network.

110. The method of claim 109 wherein said cost information comprises a maintenance schedule for selected specific components.

111. The method of claim 109 wherein said cost information comprises an installation cost for selected specific components.

112. The method of claim 109 wherein said cost information comprises a purchase price for selected specific components.

113. The method of claim 101 wherein said display is three dimensional.

114. The method of claim 101 wherein said system components allow converting between radio frequency and optical frequency.

115. The method of claim 101 wherein said system components allow converting between optical frequency and baseband frequency.

116. The method of claim 101 wherein said system components allow converting between radio frequency and baseband frequency.

117. The method of claim 101 further comprising the step of identifying errors in physical media connections for two or more specific components selected in said selecting step.

118. The method of claim 101 wherein said evaluating step evaluates cost tradeoffs.

119. The method of claim 101 wherein said evaluating step evaluates performance tradeoffs.

120. The method of claim 101 wherein said evaluating step evaluates both cost and performance tradeoffs.

121. An apparatus for designing or deploying a communications network, comprising:

a means for providing

(I) a computerized model which represents a physical environment in which a communications network is or will be installed, said computerized model providing a display of at least a portion of said physical environment, and

(II) performance attributes for a plurality of system components which may be used in said physical environment, a number of said system components having associated with them frequency dependent characteristic;

a means for selecting specific components from said plurality of system components for use in a communications network;

a means for representing said selected specific components in said display;

a means for running prediction models using the computerized model and said performance attributes to predict performance characteristics of said communications network comprised of said selected specific components, said prediction models utilizing said frequency dependent characteristics in calculations which predict said performance characteristics of said communications network; and

means for evaluating tradeoffs for one or more of cost, performance, and a combination of cost and performance.

122. The apparatus of claim 121 wherein said means for representing represents interconnections of specific components in said display.

123. The apparatus of claim 122 further comprising a means for providing an indication that two or more specific components should not be interconnected.

124. The apparatus of claim 121 further comprising a means for providing an indication that said selected specific components do or do not meet a design criteria for said communications network.

125. The apparatus of claim 124 wherein said design criteria is a performance parameter.

126. The apparatus of claim 124 wherein said design criteria is a cost parameter.

127. The apparatus of claim 124 wherein said design criteria is a component brand criteria.

128. The apparatus of claim 121 further comprising a means for generating a bill of materials containing cost information for said selected specific components utilized in said communications network.

129. The apparatus of claim 128 wherein said cost information comprises a maintenance schedule for selected specific components.

130. The apparatus of claim 128 wherein said cost information comprises an installation cost for selected specific components.

131. The apparatus of claim 128 wherein said cost information comprises a purchase price for selected specific components.

132. The apparatus of claim 121 wherein said display is three dimensional.

133. The apparatus of claim 121 further comprising a means for identifying errors in physical media connections for two or more selected specific components.

134. The apparatus of claim 121 wherein said frequency dependent characteristics provided by said means for providing define electrical properties of said system components at at least two different frequencies.

135. The apparatus of claim 121 wherein said system components provided by said means for providing allow one or more of the following: (a) converting between radio frequency and optical frequency, (b) converting between optical frequency and baseband frequency, and (c) converting between radio frequency and baseband frequency.

136. The apparatus of claim 135 wherein said performance attributes provided by said means for providing include those of system components that allow for (a) converting between radio frequency and optical frequency.

137. The apparatus of claim 135 wherein said performance attributes provided by said means for providing include those of system components that allow for (b) converting between optical frequency and baseband frequency.

138. The apparatus of claim 135 wherein said performance attributes provided by said means for providing include those of system components that allow for (c) converting between radio frequency and baseband frequency.

139. The apparatus of claim 121 wherein said means for evaluating evaluates cost tradeoffs.

140. The apparatus of claim 121 wherein said means for evaluating evaluates performance tradeoffs.

141. The apparatus of claim 121 wherein said means for evaluating evaluates both cost and performance tradeoffs.

142. The method of claim 66 wherein said step of running prediction models includes the step of utilizing said frequency dependent characteristics in calculations which predict said performance characteristics of said communications network.

143. The apparatus of claim 83 wherein said means for running prediction models utilizes said frequency dependent characteristics in calculations which predict said performance characteristics of said communications network.

144. The method of claim 14 further comprising the step of generating one or more link budgets.

145. The method of claim 144 wherein at least one of said one or more link budgets uses noise figure data from one or more components.

146. The method of claim 6 further comprising the step of generating one or more link budgets.

147. The method of claim 146 wherein at least one of said one or more link budgets uses noise figure data from one or more components.

148. The method of claim 146 wherein at least one of the one or more link budgets includes a forward link.

149. The method of claim 146 wherein at least one of the one or more link budgets includes a reverse link.

150. The method of claim 74 further comprising the step of generating one or more link budgets.

151. The method of claim 150 wherein at least one of said one or more link budgets uses noise figure data from one or more components.

152. The method of claim 66 further comprising the step of generating one or more link budgets.

153. The method of claim 152 wherein at least one of said one or more link budgets uses noise figure data from one or more components.

154. The method of claim 152 wherein at least one of the one or more link budgets includes a forward link.

155. The method of claim 152 wherein at least one of the one or more link budgets includes a reverse link.

156. The method of claim 109 further comprising the step of generating one or more link budgets.

157. The method of claim 156 wherein at least one of said one or more link budgets uses noise figure data from one or more components.

158. The method of claim 101 further comprising the step of generating one or more link budgets.

159. The method of claim 158 wherein at least one of said one or more link budgets uses noise figure data from one or more components.

160. The method of claim 158 wherein at least one of the one or more link budgets includes a forward link.

161. The method of claim 158 wherein at least one of the one or more link budgets includes a reverse link.

162. The apparatus of claim 30 further comprising a means for generating one or more link budgets.

163. The apparatus of claim 162 wherein at least one of said one or more link budgets uses noise figure data from one or more components.

164. The apparatus of claim 23 further comprising a means for generating one or more link budgets.

165. The apparatus of claim 164 wherein at least one of said one or more link budgets uses noise figure data from one or more components.

166. The apparatus of claim 164 wherein at least one of the one or more link budgets includes a forward link.

167. The apparatus of claim 164 wherein at least one of the one or more link budgets includes a reverse link.

168. The apparatus of claim 90 further comprising a means for generating one or more link budgets.

169. The apparatus of claim 168 wherein at least one of said one or more link budgets uses noise figure data from one or more components.

170. The apparatus of claim 83 further comprising a means for generating one or more link budgets.

171. The apparatus of claim 170 wherein at least one of said one or more link budgets uses noise figure data from one or more components.

172. The apparatus of claim 170 wherein at least one of the one or more link budgets includes a forward link.

173. The apparatus of claim 170 wherein at least one of the one or more link budgets includes a reverse link.

174. The apparatus of claim 128 further comprising a means for generating one or more link budgets.

175. The apparatus of claim 174 wherein at least one of said one or more link budgets uses noise figure data from one or more components.

176. The apparatus of claim 121 further comprising a means for generating one or more link budgets.

177. The apparatus of claim 176 wherein at least one of said one or more link budgets uses noise figure data from one or more components.

178. The apparatus of claim 176 wherein at least one of the one or more link budgets includes a forward link.

179. The apparatus of claim 176 wherein at least one of the one or more link budgets includes a reverse link.

180. The apparatus of claim 53 further comprising a means for providing a bill of materials to the designer based on components in the communications system modeled by said means for modeling.

181. The apparatus of claim 180 further comprising a means for generating one or more link budgets.

182. The apparatus of claim 181 wherein at least one of said one or more link budgets uses noise figure data from one or more components.

183. The apparatus of claim 53 further comprising a means for generating one or more link budgets.

184. The apparatus of claim 183 wherein at least one of said one or more link budgets uses noise figure data from one or more components.

185. The apparatus of claim 183 wherein at least one of the one or more link budgets includes a forward link.

186. The apparatus of claim 183 wherein at least one of the one or more link budgets includes a reverse link.

187. The method of claim 41 further comprising the step of providing a bill of materials to the designer based on components in the communications system modeled in said modeling step.

188. The method of claim 187 further comprising the step of generating one or more link budgets.

189. The method of claim 187 wherein at least one of said one or more link budgets uses noise figure data from one or more components.

190. The method of claim 41 further comprising the step of generating one or more link budgets.

191. The method of claim 190 wherein at least one of said one or more link budgets uses noise figure data from one or more components.

192. The method of claim 190 wherein at least one of the one or more link budgets includes a forward link.

193. The method of claim 190 wherein at least one of the one or more link budgets includes a reverse link.

194. The apparatus of claim 1 wherein said performance characteristics include a performance metric that is one or more of received signal strength (RSSI), signal-to-interference ratio (SIR), signal-to-noise ratio (SNR), frame error rate (FER), bit error rate (BER). packet error rate (PER), throughput, E_c/I_o, delay, noise figure, noise, gain, attenuation, and SINR.

195. The apparatus of claim 2 wherein said performance characteristics include a performance metric that is one or more of received signal strength (RSSI), signal-to-interference ratio (SIR), signal-to-noise ratio (SNR), frame error rate (FER), bit error rate (BER). packet error rate (PER), throughput, E_c/I_o, delay, noise figure, noise, gain, attenuation, and SINR.

196. The apparatus of claim 23 wherein said performance characteristics include a performance metric that is one or more of received signal strength (RSSI), signal-to-interference ratio (SIR), signal-to-noise ratio (SNR), frame error rate (FER), bit error rate (BER). packet error rate (PER), throughput, E_c/I_o, delay, noise figure, noise, gain, attenuation, and SINR.

197. The apparatus of claim 83 wherein said performance characteristics include a performance metric that is one or more of received signal strength (RSSI), signal-to-interference ratio (SIR), signal-to-noise ratio (SNR), frame error rate (FER), bit error rate (BER). packet error rate (PER), throughput, E_c/I_o, delay, noise figure, noise, gain, attenuation, and SINR.

198. The apparatus of claim 121 wherein said performance characteristics include a performance metric that is one or more of received signal strength (RSSI), signal-to-interference ratio (SIR), signal-to-noise ratio (SNR), frame error rate (FER), bit error rate (BER). packet error rate (PER), throughput, E_c/I_o, delay, noise figure, noise, gain, attenuation, and SINR.

199. The method of claim 6 wherein said performance characteristics include a performance metric that is one or more of received signal

strength (RSSI), signal-to-interference ratio (SIR), signal-to-noise ratio (SNR), frame error rate (FER), bit error rate (BER). packet error rate (PER), throughput, E_c/I_o, delay, noise figure, noise, gain, attenuation, and SINR.

200. The method of claim 66 wherein said performance characteristics include a performance metric that is one or more of received signal strength (RSSI), signal-to-interference ratio (SIR), signal-to-noise ratio (SNR), frame error rate (FER), bit error rate (BER). packet error rate (PER), throughput, E_c/I_o, delay, noise figure, noise, gain, attenuation, and SINR.

201. The method of claim 101 wherein said performance characteristics include a performance metric that is one or more of received signal strength (RSSI), signal-to-interference ratio (SIR), signal-to-noise ratio (SNR), frame error rate (FER), bit error rate (BER). packet error rate (PER), throughput, E_c/I_o, delay, noise figure, noise, gain, attenuation, and SINR.